

WHAT IS CLAIMED IS:

1. A method of forming a fastener product, the method comprising
providing a continuous, sheet-form base having an array of fastener elements
including molded stems extending in rows outwardly from the continuous, sheet-form
base;
5 splitting the base between adjacent rows of the fastener elements to form elongated
fastener filaments; and
twisting the fastener filaments individually to reorient the fastener elements to extend
in multiple directions from a common core.
- 10 2. The method of claim 1 wherein the fastener elements have heads that are hook-
shaped overhanging the base in one or more discrete directions.
3. The method of claim 1 wherein the fastener elements have heads that are mushroom-
shaped overhanging the base in multiple directions.
- 15 4. The method of claim 1 further comprising splitting the continuous, sheet-form base
longitudinally.
5. The method of claim 1 wherein the fastener filaments each have only one row of
20 fastener elements.
6. The method of claim 1 further comprising winding at least two of the twisted fastener
filaments together to form a yarn having fastener elements extending outwardly in multiple
directions.
- 25 7. The method of claim 1 further comprising depositing twisted fastener filaments on a
substrate to form a field of exposed fastener elements extending from the substrate.
8. The method of claim 7, wherein the twisted fastener filaments are deposited on the
30 substrate in a predetermined pattern.

9. The method of claim 8, wherein the predetermined pattern approximates a line extending substantially parallel to a longitudinal edge of the substrate.

5 10. The method of claim 8, wherein the predetermined pattern is wave-like.

11. The method of claim 7, wherein the twisted fastener filaments are deposited randomly on the substrate.

10 12. The method of claim 1 further comprising weaving the twisted fastener filaments to form a woven material.

13. The method of claim 1 further comprising weaving at least one twisted fastener filament with a non-fastener filament to form a woven material.

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14. The method of claim 1, wherein twisting the fastener filaments individually to reorient the molded fastener elements to extend in multiple directions from a common core further includes heating the fastener filaments.

20 15. The method of claim 1, wherein prior to providing the substrate the method includes molding the continuous, sheet-form base including fastener element stems, the stems integrally molded with and extending from the sheet-form base.

25 16. The method of claim 15, wherein the fastener elements are formed on a mold roll defining a plurality of hook-shaped fastener element cavities to form fastener elements having head portions extending radially outwardly in one or more discrete directions.

17. The method of claim 15 further including deforming distal ends of the stems to form overhanging heads.

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18. The method of claim 1, wherein twisting the fastener filaments individually to reorient the molded fastener elements to extend in multiple directions from a common core further includes cooling the fastener filaments.

5 19. A method of forming a fastener product, the method comprising
molding rows of fastener elements formed of synthetic resin on a mold roll defining a plurality of fastener element cavities, the fastener elements having stems extending outwardly from and integral with a continuous, sheet-form base; and
splitting the continuous base between individual rows of molded fastener elements to
10 form elongated fastener filaments, each fastener filament having one row of fastener elements.

20. The method of claim 19 wherein the fastener elements have heads that are hook-shaped overhanging the base in one or more discrete directions.

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21. The method of claim 19 wherein the fastener elements have heads that are mushroom-shaped overhanging the base in multiple directions.

22. The method of claim 19 further comprising splitting the continuous sheet-form base
20 in the machine direction.

23. The method of claim 19 further comprising chopping the fastener filaments into a plurality of filament pieces.

25 24. The method of claim 23 further comprising applying the filament pieces to a material.

25. The method of claim 19 further comprising winding at least two fastener filaments to form a yarn having fastener elements extending in multiple directions.

30 26. A method of forming fastener filament material, the method comprising
molding a continuous, sheet-form base having rows of fastener elements formed of

synthetic resin, the fastener elements having stems that extend outwardly from and integral with the continuous, sheet-form base;

splitting the continuous base between adjacent rows of the molded fastener elements to form elongated fastener filaments;

5 cutting the fastener filaments into discrete lengths of fastener filament strands; and
depositing the fastener filament strands on a substrate to form a field of exposed fastener elements extending from the substrate.

27. The method of claim 26 wherein the fastener elements have heads that are hook-
10 shaped overhanging the base in one or more discrete directions.

28. The method of claim 26 wherein the fastener elements have heads that are mushroom-shaped overhanging the base in multiple directions.

15 29. The method of claim 26 wherein splitting the continuous sheet-form base further includes twisting the fastener filaments to reorient the molded fastener elements to extend in multiple directions from a common core.

30. The method of claim 26 further comprising attaching the deposited fastener filament
20 strands to the substrate.

31. The method of claim 30 wherein the substrate includes a plurality of fibers sized to engage the fastener elements.

25 32. The method of claim 31 wherein the fastener filament strands are attached to the substrate by engaging the fastener elements with the fibers of the substrate.

33. The method of claim 30 wherein the fastener filament strands are attached to the substrate by bonding the fastener filaments to a surface of the substrate.

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34. The method of claim 26 wherein the substrate comprises non-woven fibers.

35. The method of claim 26 wherein the fastener elements are sized to engage one of loops of a loop material and the substrate to a greater extent and the other to a lesser extent.

5 36. The method of claim 26, wherein the fastener filament strands are deposited randomly on the substrate.

37. The method of claim 26, wherein the fastener filament strands are deposited on the substrate in a predetermined pattern.

10 38. A twisted fastener filament comprising
an outer surface twisted about a common core; and
a series of fastener elements disposed about the core along its length; each fastener
element comprising a stem integrally molded with the outer surface of the core with a distal
15 head overhanging the outer surface.

39. The method of claim 38 wherein the fastener elements have heads that are hook-shaped overhanging the outer surface in one or more discrete directions.

20 40. The method of claim 38 wherein the fastener elements have heads that are mushroom-shaped overhanging the outer surface in multiple directions.

41. A method of forming a nonwoven web comprising fastener filament material, the method comprising

25 molding a continuous, sheet-form material having rows of fastener elements formed of synthetic resin, the fastener elements having stems that extend outwardly from and integral with the continuous, sheet-form material;

splitting the continuous sheet of material between adjacent rows of the molded fastener elements to form elongated fastener filaments;

30 twisting the fastener filaments individually to reorient the molded fastener filaments to extend in multiple directions from a common core;

cutting the fastener filaments into discrete lengths of fastener filament strands; and
forming a nonwoven web material comprising the discrete lengths of fastener
filament strands.

5 42. The method of claim 41 wherein the method of forming a nonwoven web is selected
from the group consisting of airlaying, carding and wetlaying.

43. The method of claim 42 wherein the nonwoven web material further comprises
thermoplastic staple fibers.

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44. The method of claim 42 wherein the nonwoven web material further comprises
cellulosic fibers.

45. The method of claim 42 further comprising bonding the nonwoven web material.

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46. The method of claim 45 wherein the bonding step is a bonding process selected from
the group consisting of entanglement bonding, through-air bonding, thermal point bonding,
ultrasonic bonding and adhesive bonding.

20 47. A personal care product comprising a nonwoven web made by the method of claim
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48. A protective garment comprising a nonwoven web made by the method of claim 41.

25 49. A laminate material comprising a nonwoven web formed by the method of claim 41.

50. A personal care product comprising the laminate material of claim 49.

51. A protective garment comprising the laminate material of claim 49.

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52. A fastener product comprising:

a first twisted fastener filament including an outer surface twisted about a core and a series of stems disposed about the core along its length; and

a second twisted fastener filament wound about the first twisted fastener filament, the second twisted fastener filament including an outer surface twisted about a core and a series
5 of stems disposed about the core along its length.

53. The fastener product of claim 52, wherein the stems further include heads that overhang the outer surface.

10 54. The fastener product of claim 53, wherein the heads are hook-shaped overhanging the outer surface in one or more discrete directions.

55. The fastener product of claim 53, wherein the heads are mushroom-shaped overhanging the outer surface in multiple directions.

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56. A method of forming a fastener product comprising:

providing a strip of material having rows of fastener elements formed of synthetic resin, the fastener elements having stems that extend outwardly from the strip of material; and

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winding the material about the periphery of an inner member to reorient the stems to extend in multiple directions.

57. The method of claim 56 further including extruding resin to form the inner member.

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58. The method of claim 56, wherein the inner member comprises a rod.

59. The method of claim 58, wherein the rod is electrically conductive.

60. The method of claim 56, wherein the inner member is tubular.

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61. The method of claim 60, wherein the inner member defines a conduit for extending about an electrically conductive element.

5 62. The method of claim 56 further including attaching the strip of material to the periphery of the inner member.

63. The method of claim 56 further including heating the strip of material.

10 64. The method of claim 56 further including cooling the strip of material.

65. The method of claim 56, wherein winding the strip of material includes rotating the inner member.

15 66. The method of claim 56, wherein providing the strip of material includes molding a continuous, sheet-form material having rows of fastener elements formed of synthetic resin, the fastener elements having stems that extend outwardly from and integral with the continuous, sheet-form material; and
splitting the continuous sheet of material between adjacent rows of the molded stems to form the strip of material.

20 67. The method of claim 56 wherein the fastener elements have heads that are hook-shaped overhanging the outer surface in one or more discrete directions.

25 68. The method of claim 56 wherein the fastener elements have heads that are mushroom-shaped overhanging the outer surface in multiple directions.

69. A fastener product comprising:
an inner member; and
a strip material wound about the periphery of the inner member, the strip material
30 having rows of fastener elements formed of synthetic resin, the fastener elements having stems that extend outwardly from and integrally with a surface of the strip material.

70. The fastener product of claim 69, wherein the inner member includes resin.

71. The fastener product of claim 69, wherein the inner member comprises a rod.

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72. The fastener product of claim 71, wherein the rod is electrically conductive.

73. The fastener product of claim 69, wherein the inner member is tubular.

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74. The fastener product of claim 73, wherein the inner member defines a conduit for extending about an electrically conductive element.

75. The fastener product of claim 69, wherein the strip of material is attached to the periphery of the inner member.

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76. The fastener product of claim 69, wherein the fastener elements have heads that are hook-shaped overhanging the outer surface in one or more discrete directions.

77. The fastener product of claim 69, wherein the fastener elements have heads that are mushroom-shaped overhanging the outer surface in multiple directions.

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